

Attachment 1

Geological Investigation

(Sediment and Creek Bank Soils)



Continental Steel Superfund Site—Contract 2 Geological (Sediment and Creek Bank Soils) Investigations

TO: USEPA
FROM: CH2M HILL
DATE: December 24, 2001

Introduction

This memorandum documents activities associated with Contract 2 Geological (Sediment and Creek Bank Soils) Investigations of the Continental Steel Superfund Site (CSSS) remedial design (RD) project, Work Assignment (WA) #122-RDRD-05BW. Contract 2 includes the Kokomo and Wildcat Creeks Sediment Removal portion of the RD. Related field activities were conducted in and along the Wildcat and Kokomo Creeks. Both creeks are adjacent to the CSSS. Work associated with these investigations commenced on June 18, 2001, and was completed on July 17, 2001.

This memorandum contains the following:

- Descriptions of the personnel involved with field activities and corresponding time in which work was performed by each individual
- Descriptions of specific field activities performed
- Deviations from the *Quality Assurance Project Plan, Continental Steel Superfund Site* (May 2001; QAPP)
- Unusual circumstances encountered during field work
- Figures identifying field work areas
- Summary tables based on field notes

Personnel

Table 1 lists the field personnel associated with Contract 2 geological investigations.

Field Activities

The objective of the field activities documented in this memorandum is to reduce the uncertainties in the volumes of contaminated soil and sediment. These field activities and deviations from the QAPP are summarized in the following subsections.

TABLE 1
Personnel

Staff	Staff Role	Duration
Alan Wells/DAY	Field Team Leader	June 18 through July 17, 2001
Kelley Curran/NJO	Contract 2 Geological Investigations Lead	June 25 through July 17, 2001
Mark Eshbaugh/DAY	Contract 2 Geological Investigations Assistant	June 25 through July 17, 2001
Dave Shekoski/MKE	Contract 2 Geological Investigations Assistant	June 18 through 20, June 30, July 1, 2001
Craig LaCosse/MKE	Contract 2 Geological Investigations Assistant	June 18 through 20, June 30, July 1, 2001
John Loeffel/NJO	Contract 2 Geological Investigations Assistant	June 29 through July 3, 2001

Physical Delineation Sediment Cross Sections

Sixty-eight physical delineation cross sections were made of Wildcat and Kokomo Creeks. The delineations were undertaken to determine sediment types and relative amounts, and to verify the estimated volume of contaminated sediment. Cross section locations are depicted in Figure 1. The findings of the delineations are summarized in Table 2 and detailed in Table 3.

Deviations. Three cross section locations (CS-26, CS-38, and CS-39) were adjusted slightly in the field because of the conditions encountered at the cross section locations. In addition, one location (CS-65A) was added in Wildcat Creek and several were added in Kokomo Creek. The adjacent table compares the number of original cross section locations versus actual locations completed in the field. See Figure 1 for additional detail.

The QAPP stated that sediment cross sections would be completed using core tubes. At several cross section locations, this procedure was not possible because of deep or fast-moving water. Additionally, the presence of large cobbles, boulders, and bedrock precluded use of the tube procedure. As a result, the sediment types and thicknesses were determined using threaded metal rod, shovel, and Ponar dredge techniques.

All depth measurements (water and sediment) were made using a metal rod graduated in 6-inch intervals. At some locations, the rod was used to determine sediment type by way of audible methods or observing sediment trapped in the threads of the rod. The dredge was used in deeper or faster-moving water where core tube recovery was not possible. In shallow water (usually close to the banks), the shovel proved to be the most effective method for identifying sediments.

Dewatering Sediment Sample Collection and Testing

Thirteen sediment samples were collected in Wildcat and Kokomo Creeks for qualitative dewatering testing (Figure 1; Tables 4 and 5). The dewatering test results will be used to evaluate the post-excavation sediment handling requirements.

TABLE 2
Number of Cross Section Locations

Creek	Planned Locations	Actual Locations
Kokomo	10	22
Wildcat	42	43
Confluence	1	2

Deviations. The QAPP sample summary tables listed the dewatering sediment samples as SD-7 through SD-18. The sample naming scheme was changed to DS-1 through DS-12 in the field. In addition, a 13th sample (DS-13) was collected at CS-29. Three sample locations (DS-1, DS-2, and DS-5; Figure 1) were adjusted to target actual sediment accumulations.

Core tubes were the approved method of sediment dewatering sample collection listed in the QAPP. Given the difficulties posed by using the core tubes, and because these sediment samples were not planned to be used for laboratory analysis, a shovel was determined to be the best method for collection in the field. A shovel was used at all locations except one (DS-4); in that instance, a hand auger was used.

The QAPP field dewatering standard operating procedure indicated that the tests would be completed by means of dewatering boxes with a limited number of sediment admixtures. However, the concept of using geotubes for sediment dewatering was developed before any of the dewatering testing had been completed, so the field test procedure was modified to reflect this potential dewatering alternative. The modified test procedure consisted of:

1. Hanging bags constructed of geotube material. The bags measured roughly 28 by 34 inches. Four hanging loops were attached at the four corners of the bag top. The bags were hung to allow gravity drainage and capture of the drain water.
2. Mixing 5 gallons of sediment with 5 gallons of water. Potable water from the City of Kokomo distribution system was used to augment the amount of water present in the sediment samples.
3. Pouring the sediment/water mixture into the bags.
4. Measuring the time necessary for the standing water to drain from the bag. The stop time for this interval was taken as that time when the entire surface of the sediment in the bag was visible.

Lastly, samples of the dewatering test drain water were collected for analysis by the contract laboratory program. This was not included in the QAPP, but was done to aid in evaluating the sediment handling process. The samples were selected to represent the range of sediment materials observed in the dewatering samples.

Background Sediment Sample Collection

Sediment samples were collected at three upstream background sample locations for each creek (Figure 2). These samples were analyzed for polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), arsenic, and beryllium to determine background levels for the creeks (Table 6).

Deviations. The QAPP called for the sediment samples to be cored to complete sediment depth using a core tube. If the depth of sediment was 3 feet or greater, the core should be divided in thirds and a sample collected from each third. If the total depth of sediment is between 2 feet and 3 feet, the core should be divided in half and a sample collected from each half. If the total depth of sediment was less than 2 feet, only one sample would be collected. Sample SD-5 was not able to be cored to depth. The depth of the sediment at this location was about 70 inches, so only 31 inches was recovered in the tube core. As a result, the core was divided in half and a sample was collected from each half.

Creek Bank Soil Borings

Twenty-three creek bank borings were completed along Wildcat and Kokomo creeks. Seventeen borings were completed along Wildcat, five along Kokomo, and one just beyond the confluence of the creeks (Figure 1; Table 7). The borings were sampled to evaluate the impact of contaminated sediments on creek bank soils. The samples were analyzed for PAHs, PCBs, arsenic, and beryllium to evaluate requirements for bank soil excavation (Table 6).

Deviations. Three soil boring locations (SB-30, SB-31, and SB-39) were adjusted because of access or soil penetration issues (Figure 1). The team was unable to collect a sample at the most upstream planned location on Wildcat Creek due to the presence of large rocks. Also, location identifiers SB-30 through SB-33 initially were duplicated—one set at locations on Kokomo Creek, the other at locations on Wildcat Creek. This duplication was corrected by renaming the locations on Kokomo Creek SB-30a through SB-33a (Table 7).

All borings were completed using a hand auger. At several locations, a split-spoon driver was used in addition to the auger to assist in breaking up roots and/or rocks. At six locations (Table 7), the field team was unable to auger down deep enough to collect the 2.0- to 4.0-foot samples. Reasons for refusal include presence of bedrock, gravel/cobbles, and/or large diameter tree roots. The Site Manager was consulted and a decision was made that in these cases, only one sample would be collected (at the 0- to 0.5-foot interval).

Other Observations

The following items were observed and noted in the field logbook while conducting work in the Wildcat and Kokomo Creeks (also refer to the Comments column in Table 3):

- Trash/debris was observed both in the creeks and along the banks at several locations. Specific items observed include metal bales and coils, a hypodermic needle (CS-43), cinder blocks, tires, drums, and junk cars and car parts.
- A visible sheen was observed on the sediment at several locations. When the sediment was disturbed, a sheen would develop on the surface of the water. Many times an organic odor would accompany the sheen.
- An island roughly 100 feet long and 20 feet (maximum) wide is located in the middle of Wildcat Creek just south of the dam adjacent to the wastewater treatment plant. The island is vegetated and has several large trees.
- Several outfall pipes were observed along both creeks.
- A 4-foot-square area, apparently a seep, was identified near CS-15/SB-32a. The water there had a concentrated iron-oxide-like stain at the water line on the left bank.
- Rust-colored sediment was observed near the water line at CS-47.

TABLE 3
Creek Sediment Characterization
Pre-Design Field Investigation
Continental Steel Superfund Site.

Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
Eastern-most location in Kokomo Creek, by bridge							
CS-1 L	X			6	58	silt; many cobbles	
CS-1 M	X			12	6	silt; many cobbles	
CS-1 R				6	26	silt; many cobbles	
CS-2 L	X			12	39	silt; many cobbles	Halfway between CS-1 and R.R. bridge
CS-2 M	X			34	12	silt; many cobbles	
CS-2 R				30	12	silt; many cobbles	
CS-3 L	X			8	6	silt; many cobbles	Under R.R. bridge by flowing culvert
CS-3 M	X			10	16	sand; many cobbles	
CS-3 R				6	18	silt; many cobbles	
CS-4 L	X			16	6	course sand; rocky	
CS-4 M	X			15	3	course sand; rocky	
CS-4 R				10	4	course sand; rocky	
CS-5 L	X			14	4	course sand; rocky bottom	
CS-5 M	X			21	3	course sand; rocky bottom	
CS-5 R				24	0	course sand; rocky bottom	
CS-6 L	X			19	12	sand	
CS-6 M	X			25	5	sand	
CS-6 R				24	3	sand	
CS-7 L	X			22	13	silt; few rocks	
CS-7 M	X			30	6	silt	
CS-7 R				18	6	silt; very rocky	
CS-8 L	X			-	(a)	-	
CS-8 M	X			38	24	silt	
CS-8 R				-	(a)	-	
CS-9 L	X			13	25	silty top, sand/gravel below	
CS-9 M	X			9	41	silty top, sand/gravel below	
CS-9 R				17	18	cover	
CS-10 L	X			14	5	silt	
CS-10 M	X			15	5	silt	
CS-10 R				15	9	silt over rock; hard to pass rod	
CS-11 L	X			24	12	sand	
CS-11 M	X			34	2	sand/silt; hard bottom w/ lg. Boulders	
CS-11 R				20	6	silt	
CS-12 L	X			36	3	sand w/ many rocks	
CS-12 M	X			33	12	sand w/ many rocks	
CS-12 R				26	4	sand w/ many rocks	

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Comments

Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
CS-13	L	X		9	36	silt; odor	~100' upstream from CS-12; balls of metal rubbish ~3' square in this area; ~20% rock cover
	M			24	6	sand	
	R			23	20	silt; odor	
CS-14	L	X		28	4	sand	~100' upstream from CS-13; lots of rubbish (picnic table, metal bales of various crushed materials, etc.)
	M			28	7	sand	
	R			23	4	sand	
CS-15	L	X		28	2	silt	~100' upstream from CS-14; ~40% rock cover
	M			21	11	sand	
	R			24	25	mixed, hard	
CS-16	L	X		10	11	silt	~100' upstream from CS-15
	M			12	12	fine sand	
	R			12	6	silt	
CS-17	L	X		10	10	sand	~100' upstream from CS-16; 50' upstream from culvert
	M			19	6	sand	
	R			18	10	sand	
CS-18	L	X		19	6	silt	~100' upstream from CS-17
	M			24	3	sand	
	R			15	12	silt	
CS-19	L	X		20	7	silt	~100' upstream from CS-18
	M			27	8	sand	
	R			20	6	silt	
CS-20	L	X		14	4	sand	~100' upstream from CS-19
	M			16	4	sand	
	R			13	5	sand	
CS-21	L	X		14	16	sand	~100' upstream from CS-20 and ~100' downstream from rapids
	M			15	4	sand	
	R			8	10	sand	
CS-22	L	X		12	18	silt	~100' downstream from Park Ave. bridge; few rocks
	M			20	24	sand	
	R			15	28	silt	
CS-23	L	X	X	15	23	silt	~100' downstream from CS-22 near creek convergence; few rocks
	M			20	30	sand	
	R			22	24	silt	
CS-24	L			21	3	mixed, hard; rock filled	Under Dixon Rd. bridge, right (main) channel
	M			24	0	rock bottom	Under Dixon Rd. bridge, right (main) channel
	R	X		30	0	rock bottom	Under Dixon Rd. bridge, right (main) channel
	A			12	6	sand; few rocks	Under Dixon Rd. bridge, south channel
	B			14	12	sand; many rocks	Under Dixon Rd. bridge, middle channel

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Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
CS-25 L	X			3 22	4 9	silt with sand and organics sand with silt and cobbles	-30' downstream from bridge near Highland Park
CS-25 M	X			0	12	silt	
CS-25 R							
CS-26 L	X		98	14 23 13	0 0 0	cobbles w/ trace sed. trapped between n/a n/a	Relocated from original map location to ~150' upstream from CS-27
CS-26 ML	X						
CS-26 MR							
CS-26 R							
CS-27 L	X		116.5	11 21	0 1	cobbles w/ trace sed. trapped between poorly graded sand with trace silt	-250' upstream from Phillips St. bridge
CS-27 ML	X						
CS-27 MR							
CS-27 R							
CS-28 L	X		140	11 6 11	0 1 1	cobbles / riprap sand cobbles w/ poorly graded sand	Adjacent to Phillips St. Bridge; cobbles strewn throughout entire area at this location
CS-28 ML	X						
CS-28 MR							
CS-28 R							
CS-29 L				8	7	silt with organic material	-250' downstream from CS-28
CS-29 M	X		98	24	trace	cobble/pebble bottom; no accumulation of sediment; trace sand	
CS-29 R				23	1	gravel/cobble bottom	
CS-30 L	X			24	36	silt with organic matter	-250' downstream from CS-29; sheen appeared on water when sediment was disturbed at R location
CS-30 M	X			63	4	gravel ~1" diameter	
CS-30 R				13	13	~1" of dark grey silt; trace of sand; 14" of organic material	
CS-31 L	M		115	28 54	4 -0.5	dark grey fine silt w/ trace sand, lot of organic (twigs, leaves)	-200' downstream from CS-30 and adjacent to trailer park; sediment is trapped between other material (i.e. rocks, roots)
CS-31 M	X						
CS-31 R							
CS-32 L	X			32	22	silty sand	-150' downstream from CS-31
CS-32 M	X		-60	10 67 51	22 0 7	black, organic (plants/roots), silt matrix, slight sheen rock bottom black, organic, silt with fine sand	
CS-32 R							
CS-33 L	X			19	23	olive grey to black silty sand; trace clays w/ sheen; highly organic	-30' downstream from CS-32 near bend in creek
CS-33 M	X			29	0	rock bottom	
CS-33 R				31	1	silty sand w/ gravel	

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Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
CS-34	L X		~40	11	23	brown at top, grades to black; sandy at top grading into organic clay at base of core	~250' upstream from Markland Ave. bridge
				32	0	rock bottom	
	R			24	0	large cobbles + boulders; no accumulation of sed. (only bet. crevices)	
CS-35	L M X		~40	27	0	rocks, cobbles, bricks	~175' upstream from Markland Ave. bridge
				39	0	rock bottom	
	R			34	<1	unable to obtain sample; sounded like sand w/ many cobbles	
CS-36	L M X		~50	42	10	top is sandy silt; lt. to med. brown w/ shell fragments; grading to black organic silty clay with sheen	~30' downstream from Markland Ave. bridge
				47	2	silty sand between rock crevices	
	R			36	9	black silt w/ organic fragments	
CS-37	L M X			48	15	lt. brown silty sand w/ shell fragments/gravel grading to black silty clay w/ sheen	~125' downstream from CS-36
				67	12		
	R			76	1	sand/gravel on top of rock	
CS-38	L M X		~50	36	23	black sandy silt, organic w/ sheen	~100' downstream from CS-37
				48	15	silty sand (small amt. of silt)	
	R			79	14	black silt	
CS-39	L M X		~50	24	36	sandy silt grading to olive grey to black silt	
				36	8	sed. between rocks; black silt w/ sheen	~150' downstream from CS-38
	R			72	<1	sand/gravel	
CS-40	L M X			72	8	black silt w/ sand and gravel present	~250' upstream from dam and ~125' upstream from WWTP outfall
				24	5	olive grey sandy clay; fine to coarse-grained sand	
	R			24	1	lt. to med. brown silty sand with w/ shell fragments, mollusks, slag fragments	
	M			30	20	grey/black silt, lots of cobbles w/ sed. in between; clay particles, streaks of black; lg. pieces of slag and gravel in uppermost part	

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Creek Sediment Characterization
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Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
CS-41	L M R	X		22 66	27 0	olive grey sandy clay w/ streaks of black; fine to coarse-grained sand Rock bottom	~100' upstream of dam
				34	16	1-2" cobbles in black silt w/ organics; visible sheen	
				18	3	fine sands to coarse gravel; dark brown w/ shell fragments	~100' downstream from dam; rust color at point where creek meets right bank; bricks along left bank; hypodermic needle found floating near left bank
CS-42	L M R	X	-50	24 18	3 3		
				14	-3.5	chocolate brown silty sand; appreciable gravel, shell fragments	~250' downstream from CD-42 at the beginning of an island in the middle of the creek; metal coil located on left bank and trash (mainly tires and drums) in creek
				0	0	n/a	
CS-43	L M R	X	-50	14	14	silty sand and gravel, shell fragments, med. brown color	
				25	6	tan/grey silty sand (accumulation in front of fell tree)	~250' downstream from CS-43
				24	-2	tan/grey silty sand and gravel	
CS-44	L M R	X	-60-70	43	14		
				26 38	6 3	dark grey to black (organic) silty sand with gravel; finer at base of core	Located half way between CS-44 and confluence of Kokomo and Wildcat Creeks
				18	20	silty sand w/ gravel and pebbles	
CS-45	L M R	X	-50	16 36	4 17	dark grey to black high organic silty sand cobbles; much organic material	
				20	6	tan brown to tan silty sand (fine to med.) w/ some shell fragments and gravel	At the confluence of the Kokomo and Wildcat Creeks
				21	15	fine-grained silty sand w/ course sand/gravel at base; some organics	
CS-46	L M R	X	-40	58 24	<1 2	cobbles/boulders (sed. between)	~250' downstream from CS-45A and ~75' downstream from flood gaging station (rt. bank)
				10	5	black organic silt w/ trace of sand; some clay w/ odor	
				17 21	20 4	various-sized cobbles w/ lt. grey silty fine sand black organic silty sand w/ trace clay	~250' downstream from CS-46; several cinder blocks on bank and rust-colored sediment near water line
CS-47	M R	X	-40				

TABLE 3

Greek Sediment Characterization
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Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
L				16	5	sand and gravel matrix w/ cobble; unable to pass shovel completely	~225' downstream from CS-47; trash/debris on left bank
CS-48	M	X	~30	22	6	grey silty clay at base; grades up to coarse sand and gravel with silt; top: cobbles	
	R			6	7	siltsand/gravel in equal amount; difficult to pass rod due to cobble surface	
CS-49	L		~35	8	4	silty sand/gravel w/ considerable cobbles and shell fragments	~150' downstream from CS-48 and ~100' upstream from pipe outfall on rt. bank; visible sheen appeared when disturbed with shovel at M location
	R			24	2	sand/gravel matrix; predominantly cobble	
CS-50	L		~50		15	cobble at top, silty sand with some gravel and zone of weathered bedrock below	
	M	X		24	6	silty sand and gravel w/ trace clay plus cobbles	~150' downstream from CS-49 at outfall pipe on right bank; drum near left bank
	R			30	3	silty sand and gravel w/ cobbles	
	L			26	19	large cobbles; silty sand/gravel; lt. grey clay at base	
CS-51	M	X	~40	52	14	lt. grey silty clay	~200' downstream from CS-50
	R			30	8	tight cobble surface (difficult to pass rod); silty sand/gravel overlying rusty grey clay	
	R			8	6	silty sand and gravel; many cobbles at surface; rust color + glass and twigs	
CS-52	L		~45	24	3	hard to pass rod due to cobbles; lt. grey silt	~475' downstream from CS-51 and 150' downstream from large outfall on left bank; adjacent to Haynes property
	M	X		47	3	unable to determine	
	R			8	5	silty sand and gravel w/ lg. cobbles	
CS-53	L		~35	19	1 1/2	sed. between cobbles only-could not pass rod; silty gravel	~300' downstream from CD-52
	M	X		25	1	tan silty sand located between cobbles	
	R			6	5	silty sand and gravel w/ cobbles and shell fragments	
CS-54	L		~55	19	~1	silty gravel; between cobble bottom	
	M	X		25	0	rock--possible/probably limestone/dolomite	
CS-54	R			18	~3	organic, black sandy silt, odor, sheen	

TABLE 3
Creek Sediment Characterization
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Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
CS-55	X			16	2	sed. between lg. fragments of bedrock; silty sand and gravel	~150' downstream from CS-54; lg. rusted staircase on rt. Bank
				24	0	rock (no cobbles)	
				18	0	rock	
CS-56	X			0	3	vegetated area; silty sand between cobbles	~300' downstream from CS-55 at the beginning of a major riffle zone; Note: 2 days following a major storm event so there is considerably more water moving at a faster rate than normal conditions
				~83	13	all sed. between rocks consisting of gravel (med. to small grade) floor strewn w/ sm. boulders - fast moving water	
				30	1	med. to coarse-grained sand w/ shells all between boulders & lg. cobbles	
CS-57	X			10	6	sed. between lg. boulders	~250' downstream from CS-56 at end of major riffle zone area; slag boulders on rt. bank
				~80	30	~1/2 - 1	
				32	1/2	slity sand w/ gravel and shells; sand is med. to coarse-grained	
CS-58	X			11	2	med. to coarse-grained sand all sed. between cobbles; med. to coarse-	~250' downstream from CS-57
				~61	36	~2 - 2 1/2 grained sand	
				36	~2 - 2 1/2	all sed. between cobbles; med. to coarse-	
CS-59	X			7	~2 - 3	all sed. between cobbles; med. to coarse-grained sand w/ gravel-sized particles	~300' downstream from CS-58 and ~500' upstream of Shambaugh Run and railroad bridge
				~52	33	all sed. between cobbles; med. to coarse-	
				--	--	inaccessible due to deep water and strong current	
CS-60	X			18	3	med. to coarse-grained sand w/ gravel strewn w/ cobbles and lg. boulders; sed.	Located 1/2 way between CS-59 and Shambaugh Run
				~48	27	between cobbles/boulders	
				35	~2 - 3	sed. deposited between cobbles and boulders; course-grained sand and gravel	
CS-61	X			34	~2	cobbles and boulders; course-grained sand and gravel	Located just downstream from railroad bridge; Shambaugh Run enters Wildcat adjacent to the bridge; PVC pipe visible under water where the Shambaugh Run converges with Wildcat; junk car on left bank; vegetated island a M section
				~120	7	~2 - 2 1/2 gravel w/ fine to course sand	
				25	7	fine to coarse-grained sand w/ gravel ~1" diam.; some cobbles on creek bed	

TABLE 3

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Cross-Section Identifier	Wildcat Creek	Kokomo Creek	Width of Creek (ft)	Water Depth (in)	Sediment Depth (in)	Sediment Description	Comments
L				15	3	med. to coarse-grained sand; cobble strewn bottom	
CS-62 M	X		-90	43	3	med. to coarse gravel/sand; cobble strewn bottom	
R				35	7	-1-2" of gravel/sand; ~5" of black organic matter; cobble strewn bottom	
CS-63 M	X		-55	54	6	course sand	
R				66	trace	rock w/ trace sediment	
CS-64 M	X		-60	39	0	course sand and gravel with organic material below; strewn with cobbles	
R				35	0	rock bottom	
CS-65 M	X		-60	36	0-1	rock w/ trace sediment pockets	
R				40	0	rock bottom	
CS-65A M	X		-65	33	0	rock bottom	
R				29	~2	fine to coarse-grained sand w/ trace silt	
CS-66 M	X		-175	36	2	med. to coarse-grained sand w/ gravel	
R				66	0	rock bottom	
CS-66 M	X		-175	18	3	fine to med.-grained sand w/ trace organics	
R				58	0	rock bottom	
CS-66 M	X		-175	48	0	rock bottom	
R				29	2	silt w/ trace sand; organic	

Notes:

a. "L", "M" and "R" represents the relative location within the stream (while facing downstream); Left, Middle and Right.

TABLE 4
 Dewatering Sample Collection Summary
 Pre-Design Field Investigation
 Continental Steel Superfund Site

Dewatering Sample Identifier	Creek/Reach	Date	Method	Comments
DS-1	Kokomo/4	06/25/2001	shovel	~30' downstream from bridge near Highland Park (CS-25) in center of vegetated area in middle of Kokomo Creek
DS-2	Kokomo/4	06/26/2001	shovel	at CS-18 from middle section
DS-3	Kokomo/4	06/26/2001	shovel	at CS-13 from middle to left side of channel
DS-4	Wildcat/6	06/28/2001	hand auger	at CS-31 from right side of channel
DS-5	Wildcat/5	06/30/2001	shovel	directly beneath Markland Ave. bridge (left side); sediment: dark brown silty matrix w/ black organic clays, sand, and gravel (gravel to cobbles to cobbles), iridescent sheen visible, slag and brick fragments as well as limestone and dolomite present
DS-6	Wildcat/5	06/30/2001	shovel	~40' downstream from WWTP near right bank; sediment: med. to dark brown to olive grey clayey silt (organic) w/ lg. rock fragments and a definite sheen
DS-7	Wildcat/5	07/10/2001	shovel	at CS-45 near right bank
DS-8	Wildcat/3	07/10/2001	shovel	at CS-48 near right bank; several drums and bricks located on bank at this location
DS-9	Wildcat/3	07/12/2001	shovel	at CS-54 ~10' from right bank
DS-10	Wildcat/3	07/12/2001	shovel	at CS-59
DS-11	Wildcat/2	07/10/2001	shovel	at CS-61 between right and middle section locations
DS-12	Wildcat/2	07/10/2001	shovel	at CS-24 ~40' upstream from Dixon Rd. bridge in front of riprap in middle portion of channel
DS-13	Wildcat/6	06/27/2001	shovel	at CS-29

Notes:

a. "Left", "Middle" and "Right" refers to the relative location within the stream (while facing downstream).

TABLE 5
Dewatering Sample Test Summary
Pre-Design Field Investigation
Continental Steel Superfund Site

Dewatering Sample Identifier	Creek/Reach	Date	Start Time (24 Hour)	Stop Time (24 Hour)	Elapsed Time (Hrs:Mins)	Drain Water Analyses		
						VOCs	PCBs	PAHs
DS-1	Kokomo/4	10/02/2001	7:56	8:47	0:51			
DS-2	Kokomo/4	08/21/2001	12:04	12:59	0:55	X	X	X
DS-3	Kokomo/4	10/02/2001	7:35	8:08	0:33			
DS-4	Wildcat/6	08/28/2001	11:54	19:15	7:21			
DS-5	Wildcat/5	08/16/2001	11:37	18:10	6:33	X	X	X
DS-6	Wildcat/5	08/29/2001	13:07	17:23	4:16	X	X	X
DS-7	Wildcat/5	10/02/2001	7:46	9:18	1:32			
DS-8	Wildcat/3	10/02/2001	7:54	8:18	0:24			
DS-9	Wildcat/3	08/22/2001	11:33	15:38	4:05	X	X	X
DS-10	Wildcat/3	08/24/2001	8:20	9:13	0:53			
DS-11	Wildcat/2	08/22/2001	12:07	12:30	0:23	X	X	X
DS-12	Wildcat/2	08/24/2001	8:29	9:08	0:39			
DS-13	Wildcat/6	08/21/2001	11:49	12:52	1:03	X	X	X

Notes:

a. VOCs (Volatile Organic Compounds), Polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and metals analyses completed by USEPA's Contract Laboratory Program.

b. The qualitative field dewatering tests were performed in the field by CH2M HILL personnel.

TABLE 6

Sediment Sample Analytical Summary
Pre-Design Field Investigation
 Continental Steel Superfund Site

Location Identifier	Location Type	Date Sampled	Sample Interval(s) (feet below surface)	Analyses			
				PCBs	PAHs	Arsenic	Beryllium
<i>Background Sediment</i>							
SD-1	Sediment	07/16/2001	0 - 1 1 - 2	X	X	X	X
SD-2	Sediment	07/16/2001	0 - 1.35 1.35 - 2.7	X	X	X	X
SD-3	Sediment	07/16/2001	0 - 0.5	X	X	X	X
SD-4	Sediment	07/17/2001	0 - 1.9	X	X	X	X
SD-5	Sediment	07/16/2001	0 - 1.3 1.3 - 2.6	X	X	X	X
SD-6	Sediment	07/17/2001	0 - 0.9	X	X	X	X
<i>Creek Bank Soils</i>							
SB-22	Soil Boring	06/27/2001	0.0 - 0.5 1.6 - 2.2	X	X	X	X
SB-23	Soil Boring	06/27/2001	0.0 - 0.5 2.0 - 4.0	X	X	X	X
SB-24	Soil Boring	06/28/2001	0.0 - 0.5 2.0 - 4.0	X	X	X	X
SB-25	Soil Boring	06/28/2001	0.0 - 0.5 2.0 - 4.0	X	X	X	X
SB-26	Soil Boring	06/29/2001	0.0 - 0.5	X	X	X	X
SB-27	Soil Boring	06/29/2001	0.0 - 0.5	X	X	X	X
SB-28	Soil Boring	06/29/2001	0.0 - 0.5	X	X	X	X
SB-29	Soil Boring	06/30/2001	0.0 - 0.5 2.0 - 2.5	X	X	X	X
SB-30	Soil Boring	07/11/2001	0.0 - 0.5 2.5 - 3.0	X	X	X	X
SB-30a	Soil Boring	06/30/2001	0.0 - 0.5 2.0 - 2.5	X	X	X	X
SB-31	Soil Boring	07/11/2001	0.0 - 0.5 2.5 - 3.0	X	X	X	X
SB-31a	Soil Boring	06/30/2001	0.0 - 0.5	X	X	X	X
SB-32	Soil Boring	07/11/2001	0.0 - 0.5 2.0 - 2.5	X	X	X	X
SB-32a	Soil Boring	06/30/2001	0.0 - 0.5 2.0 - 2.25	X	X	X	X
SB-33	Soil Boring	07/11/2001	0.0 - 0.5 2.5 - 3.0	X	X	X	X
SB-33a	Soil Boring	07/01/2001	0.0 - 0.5 2.0 - 4.0	X	X	X	X
SB-34	Soil Boring	07/11/2001	0.0 - 0.5 2.0 - 2.5	X	X	X	X
SB-35	Soil Boring	07/12/2001	0.0 - 0.5 2.0 - 3.0	X	X	X	X
SB-36	Soil Boring	07/12/2001	0.0 - 0.5 2.0 - 2.5	X	X	X	X
SB-37	Soil Boring	07/12/2001	0.0 - 0.5 2.5 - 3.0	X	X	X	X
SB-38	Soil Boring	07/12/2001	0.0 - 0.5	X	X	X	X
SB-39	Soil Boring	07/12/2001	0.0 - 0.5	X	X	X	X
SB-40	Soil Boring	07/12/2001	0.0 - 0.5 2.5 - 3.0	X	X	X	X

Notes:

- a. Polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), arsenic and beryllium analyses completed by USEPA's Contract Laboratory Program.

TABLE 7
Creek Bank Soil Borings
Pre-Design Field Investigation
Continental Steel Superfund Site

Soil Boring Identifier	Wildcat Creek	Kokomo Creek	Collection Date	Depth (ft)	Soil Description	Comments
SB-22	X		06/27/2001	0.0 - 0.5 1.6 - 2.2	dark brown, moist, silty sand w/ roots black, silt w/ trace sand; strong organic odor	1st attempt to collect SB-22 at CS-26 not possible due to presence of gravel at depth <2 ft; collected SB-22 on right bank at CS-28; water in borehole has a visible sheen.
SB-23	X		06/27/2001	0.0 - 0.5 2.0 - 4.0	dark brown silt, trace sand, roots 2.0 - 3.5: dark brown silt, trace sand; 3.5 to 4.0: black silt, heavy organic content/odor	at CS-30
SB-24	X		06/28/2001	0.0 - 0.5 2.0 - 4.0	dark brown, moist, silt w/ trace of sand, organic matter (roots) grey, moist, silty sand	at CS-32 on left bank; several cobbles of what appears to be concrete rubble removed while augering
SB-25	X		06/28/2001	0.0 - 0.5 2.0 - 4.0	silt w/ trace sand, roots, worms/centipedes present	at CS-34 along left bank; samples collected in area of heavy wetland vegetation
SB-26	X		06/29/2001	0.0 - 0.5	dark brown, moist, clayey silt w/ dark brown silt dark brown, clayey silt, few small cobbles ~1" diam.	at CS-36 along right bank; unable to auger down to collect 2.0 to 4.0' sample due to refusal by lg. cobble
SB-27	X		06/29/2001	0.0 - 0.5	dark brown, clayey silt, few small cobbles ~1" diam.	between CS-38 and CS-39; @ 1135 encountered sandstone cobble ~1' down, broke cobble up w/ hand driver, hand augered down ~0.75' and encountered another sandstone cobble, could not break up w/ driver; no 2.0 to 4.0 sample collected at SB-27; SB-27 designated MS/MSD sample for QC purposes
SB-28	X		06/29/2001	0.0 - 0.5	organic soil, med. to dark brown silt w/ clay, gravel, and sand (in order); loose and plastic	at CS-40 along left bank; a duplicate sample was collected at the 0.0 to 0.5' depth for QC purposes; at 1515 tried to auger down to 2.0 to 4.0' depth but came to refusal point, used split-spoon driver but driver locked up; upon receipt of additional tools, unlocked the driver--able to drive down another 18" until refusal at bedrock, unable to collect the 2.0 to 4.0' sample at this location
SB-29	X		06/30/2001	0.0 - 0.5 2.0 - 2.5	lt. brown clay, moist, w/ silt and sand, some organics; sand <5% med. to fine-grained; some shell fragments silt w/ stiff clay, sand, and gravels, wet w/ highly saturated pores; gravel is often irregular, angular, limestone; overall a grey color and clay at times is lt. brown to tan	~25' upstream from the RR bridge along left bank; stones and gravel prevented further boring past depth of 2.5' -- 2 holes attempted, ~1' apart

TABLE 7
Creek Bank Soil Borings
Pre-Design Field Investigation
Continental Steel Superfund Site

Soil Boring Identifier	Wildcat Creek	Kokomo Creek	Collection Date	Depth (ft)	Soil Description	Comments
SB-30	X		07/11/2001	0.0 - 0.5 2.5 - 3.0	dark brown, silt w/ fine sand, organic matter (roots), moist dark grey, very moist, strong organic odor, silt w/ fine sand, organic matter (roots) present	~30' downstream from CS-42 along left bank
SB-30a	X		06/30/2001	0.0 - 0.5	silt, brown, damp, w/ small (0-1" diam.) clay particles; root (organic matter) common; clay is brown and produces 1/2" ribbons; some iron oxides present and fine sands	sample collect from left bank directly across from culvert; rocks prevented further vertical penetration past depth of 2.5'
				2.0 - 2.5	silt w/ minor amounts of clay; clay is (0-1/4") particles lt. brown to brown; highly saturated and wet; grey to black in color predominantly; much organic matter present and faint smell of organic decay; humic	
SB-31	X		07/11/2001	0.0 - 0.5 2.5 - 3.0	dark brown silt w/ trace of fine sand dark brown, moist silt with fine sand, black organic matter and rust-colored portions, strong organic odor	~50' downstream from end of vegetated island along right bank
SB-31a	X		06/30/2001	0.0 - 0.5	clayey silt, moist, organic rich, smells of decaying matter; occasional gravel, angular limestone pieces, shell fragments minor but present whole and in pieces; some areas are lt. brown, but predominantly dark grey in	sample collected from right bank ~250 upstream from entry point (road); could not penetrate beyond 12" due to gravel; tried 3 holes w/in a 5' section of bank w/ similar result
SB-32	X	X	07/11/2001	0.0 - 0.5 2.0 - 2.5	dark brown silt w/ reddish-brown sand-like material 1st 3" is black organic silt w/ strong odor; next 3" is well-graded sand, saturated	at CS-45A just beyond confluence of Wildcat and Kokomo Creeks along right bank

TABLE 7
Creek Bank Soil Borings
Pre-Design Field Investigation
Continental Steel Superfund Site

Soil Boring Identifier	Wildcat Creek	Kokomo Creek	Collection Date	Depth (ft)	Soil Description	Comments
SB-32a	X	X	06/30/2001	0.0 - 0.5	organic rich silt w/ minor amounts of clay; moist to wet, brown to black in color w/ organic decay odor	at CS-15; numerous locations attempted on both sides of the Creek--entire area is rock/gravel; a 4' x 4' area with what appears to be a seep was identified in the area--water is a distinct iron oxide-like orange
				2.0 - 2.25	gravelly silt; some noticeable streaks of oily substance; grey in color; gravel is often irregular shaped; some clay gravel-sized portions in sample; highly saturated and wet; some (<10%) organic matter; clay found is stiff and silty; clay produces ~1" ribbons; slight sheen visible	
SB-33	X	X	07/11/2001	0.0 - 0.5	dark brown, moist, silt w/ organic matter (roots)	at CS-47 along left bank; a duplicate was collected from the 2.5 to 3.0' depth for QC purposes
				2.5 - 3.0	grey, silt w/ sand	
SB-33a	X	X	07/01/2001	0.0 - 0.5	silty clay, moist, lt. brown to black, some oxidation present, roots, shell fragments and rare angular fragments of limestone gravel, very little elasticity, slight odor	~250' upstream from Park Ave. bridge and ~30' upstream from log jam along left bank; shoreline is very rocky, ranging from gravel to large cement pieces; right bank had too much gravel to penetrate beneath surface
				2.0 - 4.0	silt w/ gravel, wet, grey to black in color; gravel is composed of predominantly angular to sub-rounded limestone fragments; some shale (black) and lesser portions of slag and cement; strong odor with slight sheen present; lg. pieces of tar-like substance at ~4' interval recovered	
SB-34	X	X	07/11/2001	0.0 - 0.5	lt. brown, moist, silt w/ sand or possible slag-like material, no odor	at CS-49 along right bank
				2.0 - 2.5	lt. tan silt w/ sand, trace cobbles up to 1" diam., moist, no odor	

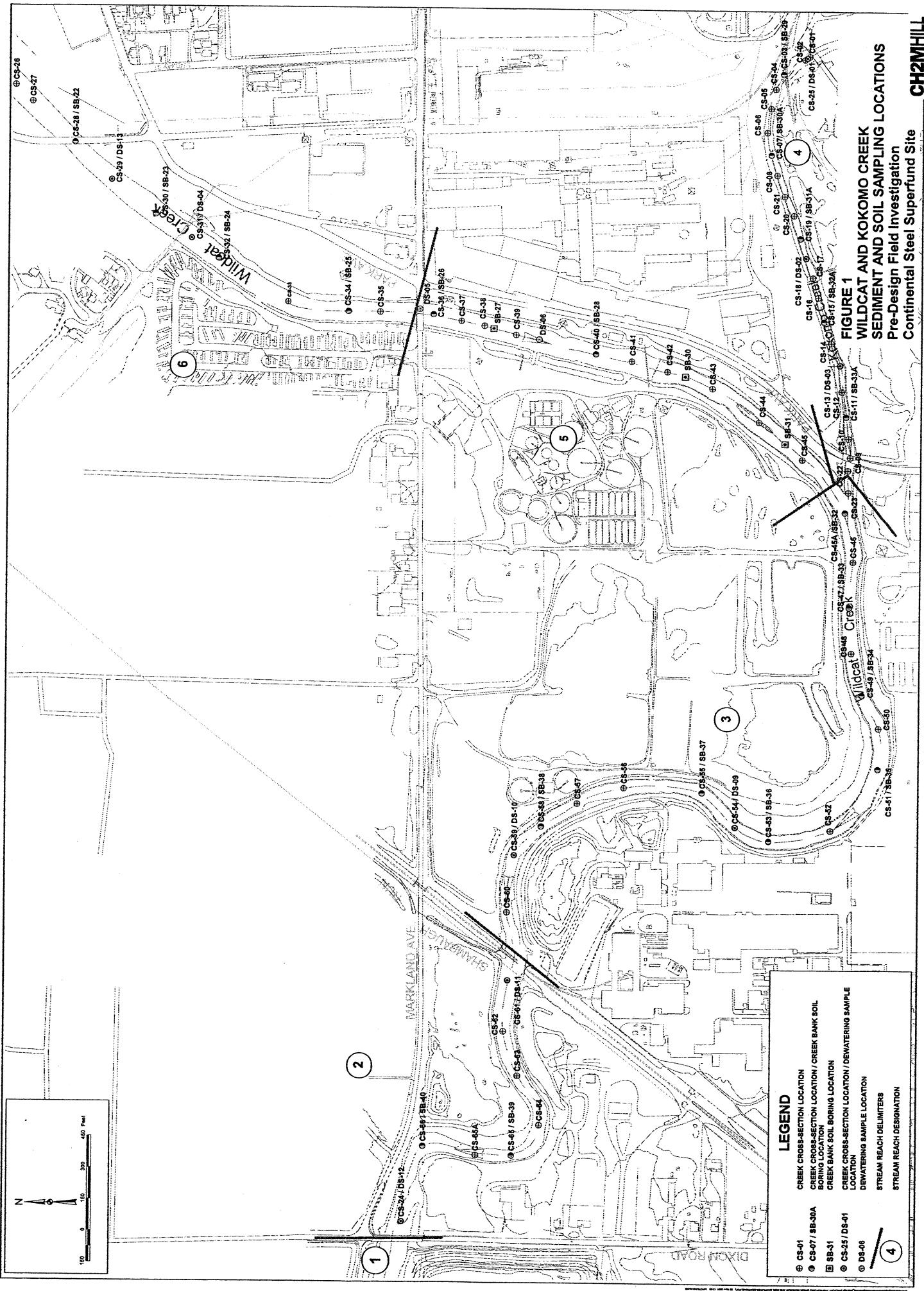
TABLE 7
Creek Bank Soil Borings
Pre-Design Field Investigation
Continental Steel/Superfund Site

Soil Boring Identifier	Wildcat Creek	Kokomo Creek	Collection Date	Depth (ft)	Soil Description	Comments
SB-35	X		07/12/2001	0.0 - 0.5 2.0 - 3.0	rust-colored silt with fine sand, roots & worms present moist, med. brown silt with fine to course-grained sand, some rust and black coloring visible	at CS-51 along right bank; refusal met at 3'
SB-36	X		07/12/2001	0.0 - 0.5	dark brown, slightly moist, silt w/ sand, organic matter (roots)	at CS-53 along right bank, refusal at 2.5' due to lg. cobble
SB-37	X		07/12/2001	0.0 - 0.5 2.0 - 2.5	dark brown, saturated, silt w/ fine to coarse sand, fine gravel, and organics	at CS-55 at and angle from the left bank; 0.0 to 0.5' sample designated MS/MSD for QC purposes
SB-38	X		07/12/2001	0.0 - 0.5 2.5 - 3.0	dark brown sandy silt, sand particles are fine to med. grained brown, moist, clay w/ sand and trace gravel	at CS-58; abandoned first hole and began a second hole next to the first one, unable to collect deeper sample due to the presence of a lg. diam. roots that prevented further augering--attempted to use driver to break through roots w/out success
SB-39	X		07/12/2001	0.0 - 0.5 --	dark brown, moist, organic matter (roots), silt w/ fine sand	abandoned original hole at CS-64 along right bank--could only auger down ~3-4"; relocated to CS-65; unable to collect 2.0 to 4.0' sample due to presence of ~1' diam. tree root
SB-40	X		07/12/2001	0.0 - 0.5 2.5 - 3.0	dark brown silt, moist, organic matter (roots) dark grey sandy (fine-grained) silt w/ trace coarse gravel	at CS-66 along right bank

Notes:

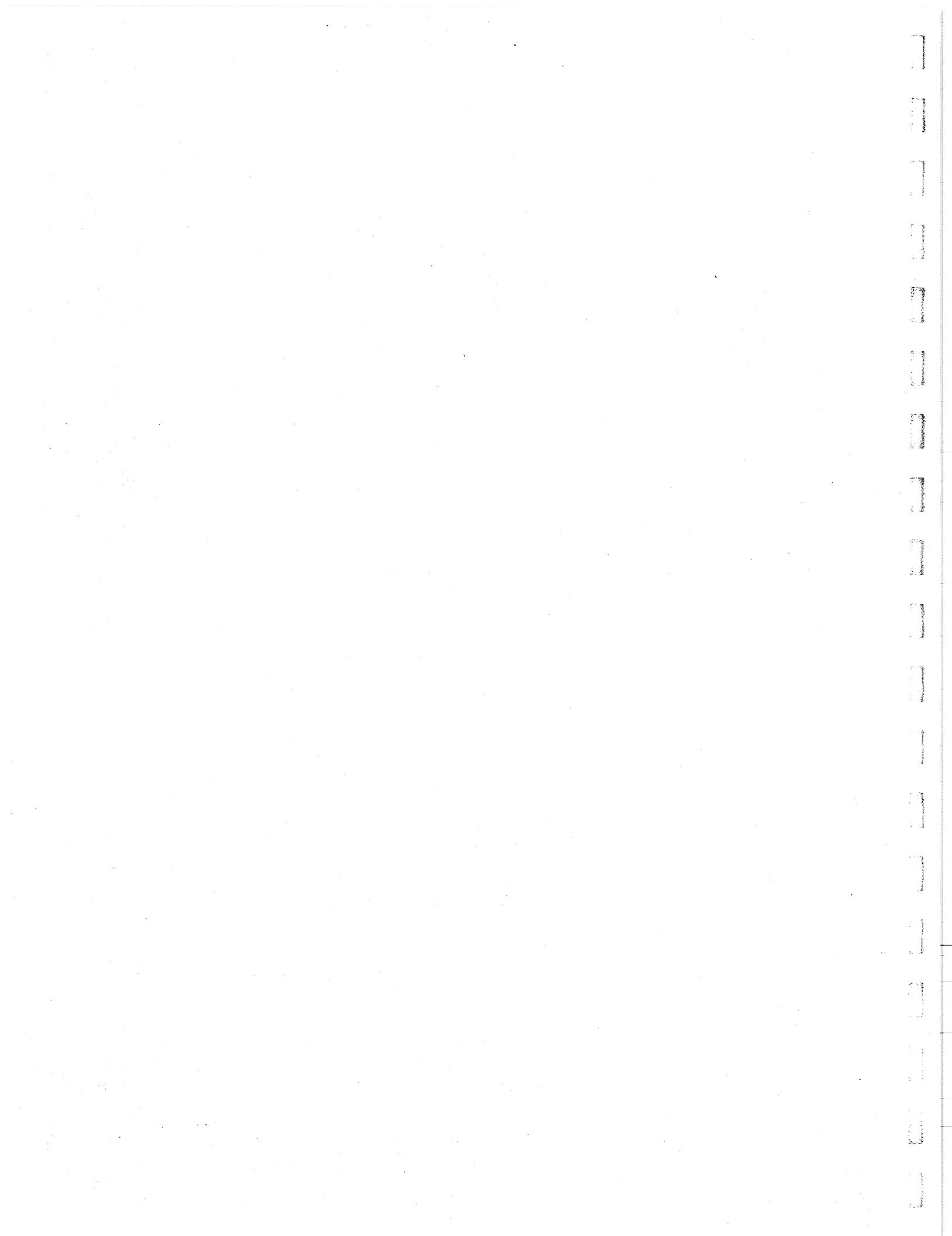
- All samples were collected using a hand auger. At several locations, a split-spoon driver was used in addition to the auger to assist in breaking up roots and/or rocks.
- "MS/MSD" represents Matrix Spike/Matrix Spike Duplicate.
- "QC" represents Quality Control.
- "L", "M" and "R" represents the relative location within the stream (while facing downstream); Left, Middle and Right.
- "CS-#" represents the cross-section identifier. See Table 3.

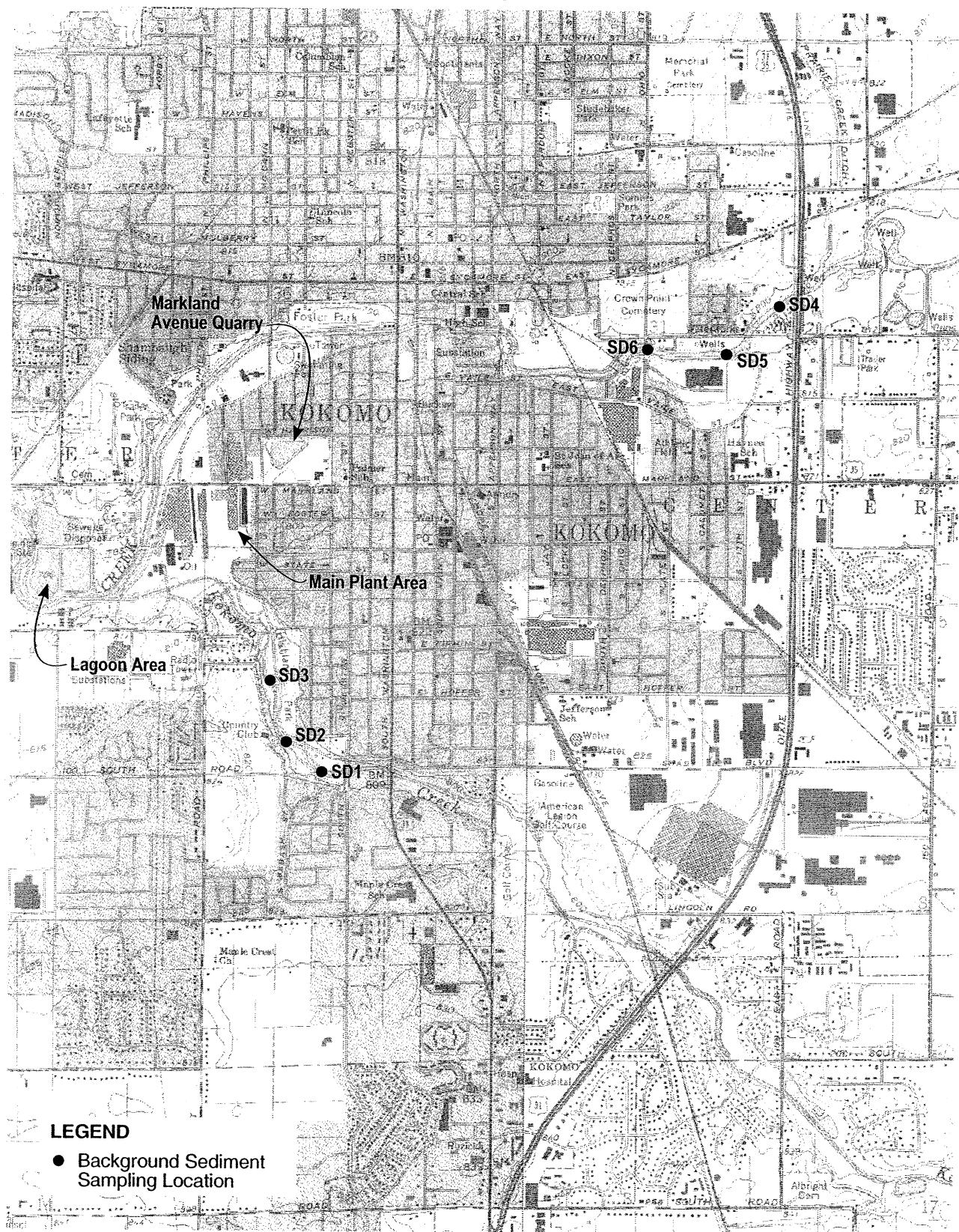




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FIGURE 1
WILDCAT AND KOKOMO CREEK
SEDIMENT AND SOIL SAMPLING LOCATIONS
Pre-Design Field Investigation
Continental Steel Superfund Site





0 2500
SCALE IN FEET

FIGURE 2
Background Sediment Sampling Locations
Pre-Design Field Investigation
Continental Steel Superfund Site

